

determine by merely passing through on a fast train, but it seems likely that the land is a little too flat and wet for the best development of *Pinus palustris* and a little too dry and perhaps not sandy enough for *Pinus Elliottii* to grow well, and that no other trees have happened to gain a foothold. The winds from the nearby Gulf may have something to do with keeping the pines down to a uniform height.

In the southeastern part of Jackson County, near the Alabama line, *Taxodium imbricarium* is quite common in ponds. Before making this trip I had no definite information as to its occurrence farther west than Alabama, except Dr. Hilgard's mention of cypress ponds in the maritime counties of Mississippi.\*

## OBSERVATIONS ON THE OCCURRENCE OF BOOTT'S FERN

BY PHILIP DOWELL

These observations are quite limited, both in regard to the time and the area covered, more limited than might be desired for publication, but they may serve to bring out others more exhaustive and thus help to further our knowledge of the origin and distribution of *Dryopteris Boottii* (Tuckerm.) Underw. They are recorded now partly in response to an appeal made in the *Fern Bulletin* by Professor A. B. Klugh for further information in line with his own observations on this fern.† Speaking of the occurrence of the fern in Ontario he says: "It never occurs in any abundance, most usually in a single plant . . . it is exactly intermediate between its possible parents . . ."

I find no record of the fern having been found on Staten Island before 1903, when a single clump of three plants was found in a woodland swamp near South Avenue. This is a remnant of virgin forest and is a favorable place for the Goldie, Clinton, crested,

\*Op. cit., pp. 367, 368. The "long-leaf pine" mentioned by Dr. Hilgard as growing in the same ponds is of course *Pinus Elliottii*, which was not recognized as distinct until twenty years later.

† *Fern Bulletin* 13: 86. Jl 1905. 14: 70. Jl 1906.

and the spinulose ferns, which all grow here within a small area. Five clumps of *Dryopteris cristata*  $\times$  *marginalis* Davenp., as well as a number of more common ferns have also been found on this area.\* The swamp is moderately wet, not densely shaded but open enough to support a good undergrowth of grasses and other herbaceous plants besides the spicebush and other small shrubs. This was the only locality known on Staten Island for Boott's fern, until 1905, when I spent the summer on the island and found this fern at other stations. One of these is a little pond near Bradley Avenue, where I found, July 3, a colony of four plants, one of them several feet from the rest, growing on the grassy border of the pond. This is a sparsely shaded border covered with grass and other small undergrowth with a few plants of *Dryopteris cristata* (L.) A. Gray and one plant of *Dryopteris spinulosa* (Retz.) Kuntze. In the next locality in which the fern was found, on August 2, 1905, there were several plants of *D. Boottii* with *D. cristata* and *D. spinulosa* growing on grassy tussocks or at the bases of willows in a small swamp that has standing water most of the year. This swamp is below Ocean Terrace, west of Dongan Hills. On the following day (August 3) I found the fern at Bull's Head in the more open part of a large grassy swamp in which there is quite an abundant growth of *D. spinulosa* with an occasional *Dryopteris spinulosa intermedia* (Muhl.) Underw. and several plants of *D. cristata*. Three clumps of *D. Boottii* were found at this station growing several feet apart. Two weeks later (August 17) several plants of the fern were found growing on both sides of Ketchum's Mill Pond Brook, west of Richmond. In the swampy places along this brook *D. spinulosa* is abundant, and the subspecies *intermedia* is frequent. *Dryopteris Clintoniana* (D. C. Eaton) † and *D. cristata* also grow here, the latter comparatively abundant. This swamp is more shady than the others mentioned and thus less grassy, portions of it are more densely covered with underbrush, and it is moderately wet. Here I have counted at one time as many as eighteen plants of *D. Boottii* scattered through the swamp. In the first

\* See Proceedings S. I. Assoc. 1: 66. 1906.

† See Proceedings S. I. Assoc. 1: 64. 1906.

locality, along South Avenue, I found this summer another plant of this fern several rods away from the first clump found in 1903. This shows that a plant may be easily overlooked in a certain locality, for I have visited this place more often than any other of my fern haunts, each time in the hope of discovering another plant of the fern. It shows also that the fern may be present in other places on Staten Island besides the five stations mentioned, even though it has not been found.

Near Suffern, Rockland County, N. Y., I visited a swamp in company with Mr. Wm. T. Davis, July 23, 1905, and after a short search I found one plant of the fern near one end of the swamp. Near the other end of the swamp there were a number of plants of this fern growing with several plants of *D. cristata*  $\times$  *marginalis* and others. The latter portion of the swamp had been partially cleared of timber. The main swamp had some large trees and supported a rather luxurious vegetation, consisting largely of ferns. The osmundas and the spinulose ferns were most abundant, as is usual in such a swamp in this region. Then there were the Clinton, Goldie, crested, marginal and other ferns.

On September 3 of the same year Mr. S. C. Edwards took me to a swamp near Lisle, Broome County, N. Y., where we spent about an hour climbing about on fallen trees and mossy hummocks over the boggy ground, and we found a colony of two or three vigorous plants of *D. Boottii* among other interesting plants. *D. cristata* and *D. spinulosa* were also present.

In the vicinity of Mountain Lodge, Old Forge, N. Y., during the time of the Symposium this year, I found Boott's fern at four different places, in each of which *D. Boottii* was found more abundant than *D. cristata*. These were open grassy swamps near the borders of lakes or else where the forest had been partly cleared. *Dryopteris spinulosa* was also found in these open grassy swamps; but it was not found in the denser forest where the subspecies *intermedia* abounded.

The most luxuriant growth of Boott's fern that has come under my observation is that of a swamp near Newfoundland, N. J., which Mr. Davis and I partially explored on July 28 of this year, and which I visited again on September 3. We found the

fern comparatively abundant in this swamp, about equally abundant with either of the spinulose ferns. The Clinton fern was somewhat less abundant, and the crested fern proved its presence by two plants found. The swamp is about half a mile long and about ten rods wide, narrowing at the ends. It is a rather wet, half-shaded swamp with little undergrowth of shrubs, but with a few large trees and a herbaceous undergrowth of which the ferns form a prominent part.

Again, under the guidance of Mr. Wm. H. Smith, I found Boott's fern September 8 at Maplewood, N. J. It is true I found only three plants of it, but at the same time I found only one of the crested fern and only a few spinulose ferns. The main part of the swamp visited has been cleared of timber and is overgrown largely with weeds, chiefly *Polygonum arifolium* L., so the conditions are no longer favorable for swamp wood-ferns.

From my observations I am led to believe that where the conditions are favorable for the crested fern or for the Clinton fern, Boott's fern is likely to occur. These ferns seem to require similar conditions. Boott's fern and the crested fern appear to me to be closest in their requirement of light, since they are found in open sunny places where the Clinton fern does not usually grow. These ferns are more rare in their general distribution in this region than either of the spinulose ferns and may be classed among the rarer ferns. On the other hand any one of the three is less rare than Goldie's fern in the localities I have examined. I have found the crested fern in more localities than Boott's fern, and the latter in more places than the Clinton fern. In regard to the question of hybridity I can neither prove nor disprove the theory. The fact that *D. cristata* and *D. spinulosa* occur with *D. Boottii* may mean simply that these ferns require similar conditions. On the other hand attention might be called to the fact that their position in swamps or on the border of swamps or of ponds is favorable for the mingling of the spores or of the gametes during the seasons of the year when there is considerable water present. That Boott's fern "is exactly intermediate between its possible parents" can not be taken too literally, and this is a point against the theory of the hybrid origin of the fern.

*D. Boottii* has been described as a variety of *D. spinulosa* and as a variety of *D. cristata*, and it has been considered by many a hybrid between these two. The scales of *D. Boottii* are more abundant and of a darker brown than in either of the other two, and it is glandular, a characteristic which is absent in the other two. These objections may be met by considering as one of the parents *D. spinulosa intermedia* instead of *D. spinulosa*. Another respect in which *D. Boottii* differs from the other two is the position of its sori nearer the midvein than in either of the others. In this it is not intermediate between its supposed parents. Experiments may prove *D. Boottii* to be a hybrid, if this fern can be produced by crossing its possible parents, but until that is done we are not justified in concluding that it is a hybrid. It is to be hoped that the question may appeal to some one in a position to perform such experiments. I trust also that others who have had the opportunity of observing *D. Boottii* in the field will publish such observations.

PORT RICHMOND, N. Y.

September 8, 1906.

### SHORTER NOTES

NOTE ON THE IDENTITY OF TRILLIUM OBOVATUM PURSH. — I have observed in the July *Bulletin of the Torrey Botanical Club* that Dr. H. A. Gleason, in his treatment of the pedunculate species of *Trillium*, has made an error which I think should not go uncorrected. He has made *T. obovatum* Pursh a synonym of *T. erectum* L., and makes the statement that "it had white, obovate petals." There is nothing in Pursh's Latin description of his *T. obovatum*, page 245 of the *Flora Americae Septentrionalis*, to indicate the color of the petals; but on page 246, in his English notes, he distinctly states that the flowers are "dark rose-colored," suggesting that they might be white when first opening.

There is in the vicinity of Detroit a trillium that agrees exactly with Pursh's description of *T. obovatum* and undoubtedly is that species which, however, should be referred to *T. grandiflorum* Salisb. and not to *T. erectum* L. The flowers, on the